

Unexpected Slight Fluorodeoxyglucose-Uptake on Positron Emission Tomography in a Pulmonary Hamartoma

Ulrike Himpe, MD,* Christophe M. Deroose, MD, PhD,† Paul De Leyn, MD, PhD,‡
Eric Verbeken, MD, PhD,§ and Johan Vansteenkiste, MD, PhD*

Abstract: We report the case of a patient with suspected hamartoma with slight fluorodeoxyglucose (FDG) uptake on positron emission tomography (PET). Initially, follow-up with repeat computed tomography (CT) scan was proposed. Because of the risk for retro-obstructive pneumonia, and because there was a small increase in diameter of the lesion on CT, thoracotomy was proposed. Pathologic examination revealed a surprising and rare finding.

Key Words: Hamartoma, Fusion PET-CT, Differential diagnosis, FDG.

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A 63-year-old male patient was seen for a second opinion on a right parahilar partially calcified mass lesion. He quit smoking 1 year ago, after a 10 pack-years history. His medical history was unremarkable, except for obstructive sleep apnea treated with continuous positive airway pressure since 15 years. He had no other symptoms and clinical examination was normal.

He had been admitted to another hospital for a pneumonia in the right perihilar region. A CT-scan after resolution of the infection, showed a mass lesion with smooth margins and typical calcifications (Figure 1), suggestive for hamartoma. The lesion was slightly FDG avid on PET scan. A conservative approach had been proposed, because of the benign appearance of the lesion and because resection might necessitate a pneumonectomy. The slight FDG uptake was ascribed to inflammation.

Six months later at our institution, evaluation showed a subtle increase of the diameter of the lesion (from 37 to 41 mm), and again slight FDG uptake on PET (SUV_{max} : 3.3; SUV_{mean} : 1.7 (Figure 2). At bronchoscopy, distortion, partial



FIGURE 1. Computed tomography (CT) scan after resolution of pneumonia. Nearly 4 cm large mass lesion with smooth margins and typical calcifications, suggestive for hamartoma.

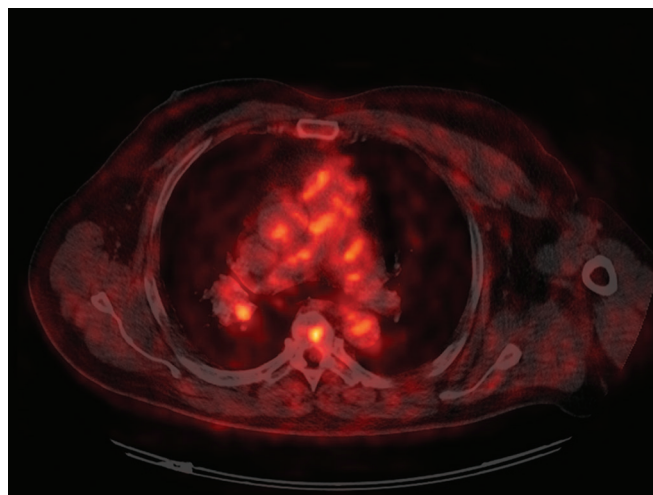


FIGURE 2. Fusion positron emission tomography-computed tomography (PET-CT) image of the lesion at follow-up. The lesion is slightly Fluorodeoxyglucose (FDG) avid, SUV_{mean} 1.7). Also note the narrowing effect of the lesion on the upper lobe bronchus.

*Respiratory Oncology Unit (Pulmonology) and Leuven Lung Cancer Group, University Hospital Gasthuisberg, Leuven, Belgium; Departments of †Nuclear Medicine, ‡Thoracic Surgery, and §Pathology, University Hospital Gasthuisberg, Leuven, Belgium.

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Address for correspondence: Johan Vansteenkiste, MD, PhD, Department of Pulmonology, Herestraat 49, 3000 Leuven, Belgium. E-mail: johan.vansteenkiste@uz.kuleuven.ac.be

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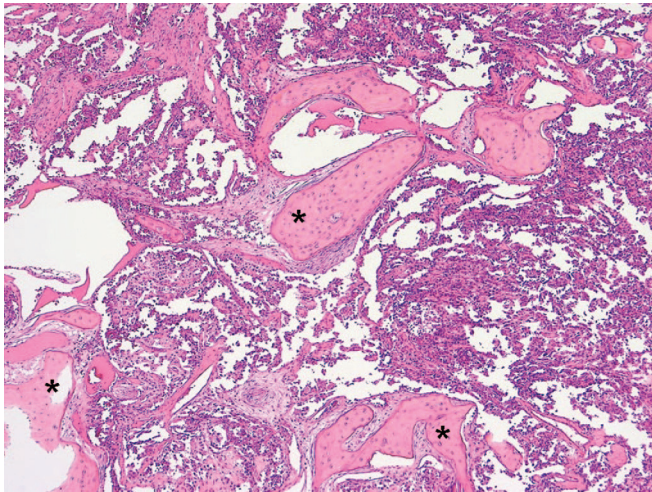


FIGURE 3. H&E stain of the resection specimen, magnification $\times 50$. Typical bronchial carcinoid tumor, with monotonous population of small eosinophilic cells, no cellular atypia, no mitosis. Several regions of mesenchymal osseous metaplasia and bone formation are discerned (*).

narrowing, and inflammatory mucosa at the right upper lobe was noted. Biopsies were nondiagnostic.

At our multidisciplinary board, hamartoma was considered to be the most likely diagnosis (with no satisfying explanation for the slight FDG uptake). Thoracotomy was proposed, because of the risk for repeat pneumonia due to airway narrowing (Figure 2), and because surgeons felt pneumonectomy could be avoided.

A right upper lobectomy was performed with complete resection of the lesion. The resection specimen showed a typical bronchial carcinoid, with several regions of mesenchymal osseous metaplasia and bone formation (Figure 3).

DISCUSSION

Pulmonary nodules or masses are often detected during the work up of a respiratory infection. Morphologic features on conventional imaging techniques can help to differentiate benign from malignant lesions.¹ Smooth, well-defined margins make primary lung cancer less likely. The presence of

intralesional fat, bone, cartilage or fibrous tissue are considered reliable indicators of hamartoma. The presence and pattern of calcification can also be helpful. There are four benign patterns of calcification: central, diffuse solid, laminated, and 'popcorn like.' The first three patterns are typically for prior infection (particularly histoplasmosis or tuberculosis), while popcorn like calcification is characteristic of chondroid calcification in a hamartoma. When present, these patterns of calcifications are reliable indicators of a benign cause. Calcifications in malignant lung tumors have been described, but are rare, usually in larger tumors and then of punctate or eccentric pattern.

FDG-PET scan is a useful noninvasive test in the differential diagnosis of indeterminate lung lesions, especially in case of intermediate chance of malignancy.² False-positive findings are associated with focal infection or inflammation. Tumors with a low metabolic rate, such as bronchiolo-alveolar carcinomas or carcinoids, may result in false-negative results, although more recent results often describe some mild FDG uptake in carcinoid lesions.³

Osseous metaplasia in carcinoid tumors is very rare. One case report describes a bronchial carcinoid with ossification in the surrounding bronchial wall, detected at preoperative bronchoscopic biopsy.⁴ Another reports a small lesion with calcification seen on CT only, thereby suggestive of broncholithiasis.⁵

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